

## PATENT SPECIFICATION

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## COMPLETE SPECIFICATION.

Improvements in or relating to the Propulsion and Steering of  
Boats for Amusement purposes.

We, REBECCA BURROW, and MARY JANE HILL, both British Subjects, and both of "Littlewood", Chislehurst Road, Orpington, in the county of Kent, do hereby declare the nature of this invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

10 This invention relates to the propulsion and steering of boats for amusement purposes.

It is common practice, in connection with outboard motor driven boat-propelling units and in the case of certain classes of canal or like boats, to arrange a vertical or substantially vertical driving shaft at the rear of the stern of a boat and to transmit the rotary motion of this shaft through bevel or other gearing to a comparatively short substantially horizontal propelling shaft fitted with one or more screw propellers and carried in bearings within a housing secured to the lower end of a sleeve surrounding the driving shaft, this sleeve and/or the said housing being rotated through suitable gearing, or directly by means of a tiller arm, in order to steer or manœuvre the boat.

30 Rudderless boats are also known in which the above indicated principles of construction are followed in the main but in which the sleeve surrounding the driving shaft extends with the latter through the hull of the boat and, in some cases, the driving shaft itself is constituted by the power shaft of an electric motor.

In such rudderless boats it has been usual to arrange the propeller and driving gear as closely adjacent the stern of the boat as is practicable but it has been proposed in connection with a boat of this kind intended for amusement purposes, in which the electric motor was adapted to be supplied with current from a source external to the boat, to arrange one propeller unit, of the propulsion type, adjacent the bow of the boat and a similar unit adjacent the stern of the boat, the two units being oppositely controlled through the medium of a flexible member, such as a rope or chain, from a common steering column for manœuvring the

boat and each driving shaft being geared through bevel gearing to the power shaft of the respective electric motor. 55

The present invention is concerned with passenger-carrying boats for amusement purposes adapted to be operated on artificial ponds or the like restricted areas of water where very frequent collisions would occur were the boats slow in answering to their helms, and has for its object to provide improved rudderless boats adapted to be both propelled and steered by screw means so arranged and disposed that they will be protected against damage due to the collisions which occur during the operation of the boats while ensuring that the boats shall be capable of executing rapid turning movements or like manœuvres. 60 65 70

According to this invention a rudderless electrically propelled passenger-carrying boat for amusement purposes adapted to be operated on restricted areas of water and supplied with electric current from an external source, comprises, in combination, a boat hull having a forward motor compartment and an after passenger-accommodating space, an electric motor mounted within the motor compartment on the longitudinal centre line of the hull with its power shaft substantially vertically disposed, a rotatable sleeve surrounding said power shaft and extending through the bottom of the boat hull, a casing secured on the lower end of said sleeve, a propeller shaft rotatably mounted in said casing at right angles to the power shaft of the motor, a tractor propeller secured on the forward end of the propeller shaft externally of the casing, means for transmitting the rotation of the power shaft to the propeller shaft in order to propel the boat, a manually rotatable steering column extending from the passenger-accommodating space into the motor compartment and means for transmitting the rotation of the steering column to the rotatable sleeve in order to steer and manœuvre the boat, the propeller never being caused to project beyond the outline of the boat during its movements. 75 80 85 90 95 100

It is preferred to transmit the rotary motion of the substantially vertical power 105

curved sheet 1<sup>d</sup> supported at its after end by transversely extending spaced bearers 1<sup>c</sup>. A seat 1<sup>e</sup> is arranged in the after end of the boat and the space at the rear of this seat is covered over by a sheet or board 1<sup>f</sup> formed near the stern wall 1<sup>o</sup> with an aperture adapted to receive the lower end of a vertically disposed mast or pole 2.

A pneumatic or other buffer strip extends completely around the boat hull 1 at or just above the water line and is shown, by way of example only, as an inflated moulded rubber tube 3 which is of flattened oval cross-section and is suitably secured in place so that the major axis of the oval is disposed substantially vertically. As will be understood, this buffer tube not only serves to reduce the shock of collisions but also adds to the buoyancy of the boat.

Slightly forward of the centre of the boat is disposed a transverse vertical partition 1<sup>h</sup> serving, in conjunction with the forward bearer 1<sup>o</sup> to which it is secured by its upper end, to separate the after passenger-accommodating space from a forward motor compartment.

This motor compartment contains an electro-motor 4 disposed with its axis substantially vertical to the bottom 1<sup>a</sup> of the boat and supported rotatably on a flanged sleeve 5 passing through the boat bottom.

As is shown more clearly in Fig. 2, the outwardly flanged lower end of the sleeve 5 is bolted to the boat bottom 1<sup>a</sup> and the upper end thereof supports on a ball thrust-bearing 6 the outwardly flanged upper end of a second or inner sleeve 7 which is secured to the casing of the motor 4, as by means of screws 7<sup>a</sup>.

The inner sleeve 7 is rotatable within and closely fits the sleeve 5, being formed at its lower end with a bearing for the lower end of the motor shaft 8 which extends axially of the sleeves and has secured thereon, beneath said bearing, a bevel gear wheel 9.

Said lower end of the inner sleeve 7 is arranged to project below the flange of sleeve 5 and the projecting portion is reduced in diameter and screw-threaded in order that a casing 10, carrying a propeller shaft 11 in suitable bearings, may be screwed thereon by its upper open tubular end. The remainder of the casing 10 is stream-lined in the usual manner, the stream-lining being completed at the normally forwardly directed end thereof by the boss of a tractor propeller 12 secured on the shaft 11.

Within the casing 10 the shaft 11 has secured thereon a bevel gear wheel 13 meshing with the bevel gear wheel 9 on the motor shaft 8.

It will be seen that rotation of the motor casing 4 will produce corresponding rotation of the sleeve 7 and casing 10 connected thereto, whereby the angular setting of the propeller shaft 11 with relation to the longitudinal axis of the boat is varied in order to steer and manœuvre the latter.

The means shown for producing such rotation of the motor 4 comprise a bevel gear wheel 14 (Fig. 1) secured on the upper end of the casing, coaxially with the motor shaft 8, and meshing with a second bevel gear wheel 15 secured on a short steering column 16 carried rotatably in the bearers 1<sup>o</sup>, a suitable hand-wheel 17 being provided for operating the said column.

When it is desired that the sleeve 7 shall only be capable of rotating through approximately one complete rotation, suitable stops are provided, such stops preferably being constituted by the usual lug or feet (not shown) on the motor casing 4 and cooperating with the partition 1<sup>h</sup> or with a stop-block secured thereto in limiting the rotation of the said casing and hence of the sleeve secured thereto to one complete rotation or approximately one complete rotation.

In the example shown the motor 4 takes its current from an overhead netting 18 through the medium of a resilient metal strip or collector arm 19 mounted on the upper end of the mast or pole 2, a wire 19<sup>a</sup> leading from the arm 19 to the motor 4 via an emergency switch 20 provided just beneath the gunwhale within easy reach of a passenger in the boat. The portion of the wire 19<sup>a</sup> directly adjacent the motor may be coiled somewhat to allow of the movement of the latter or may be connected to a brush or other contact bearing on a stud or slip-ring secured on the motor 4.

The return circuit from the motor is preferably through the motor casing and the metal of the sleeves 5 and 7 to the water on which the boat floats, a conducting sheet of netting or the like being disposed over the floor of the lake or the like. Other circuit arrangements could also be employed when desired.

Referring now to Fig. 3; several modifications are illustrated here as incorporated into one propelling and steering unit but it will be understood that only one or some of these modifications may be made if desired. Like or corresponding parts of both Figs. 1 and 2 and Fig. 3 are designated by similar reference numerals.

It will be seen that the disposition of the motor 4 and the sleeves 5 and 7 has been modified by inclining the common

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- 2, wherein the rotary motion of the power shaft or of the drive shaft is transmitted to the propeller shaft by means of bevel gearing preferably enclosed in the casing carrying the propeller shaft.
4. A boat according to any of the preceding claims, wherein the rotary motion of the steering column is transmitted directly to the sleeve through suitable gearing.
5. A boat according to any of claims 1 to 3, wherein the sleeve is secured by its upper end to the casing or stator of the electric motor which is rotatably supported within the boat.
6. A boat according to claim 5, wherein the electric motor is rotated from the steering column by means of suitable gearing or the like.
7. A boat according to claim 4 or claim 6, wherein the means for transmitting rotary motion from the steering column to the sleeve comprises a bevel gear wheel secured on the sleeve or on the casing or stator of the electric motor, respectively, and a further bevel gear wheel meshing with the said gear wheel and mounted on the steering column.
8. A boat according to any of the preceding claims, wherein the rotary movement of the sleeve is limited to one complete rotation by means of suitable stop or the like.
9. A boat according to any of the preceding claims, wherein the propeller shaft is arranged to be forwardly and upwardly inclined when set forward propulsion of the boat, so that the rotation of the propeller or propellers produces an upward thrust on the bow of said boat.
10. A boat according to any of the preceding claims, wherein the forward portion of the bottom of the hull is upwardly inclined.
11. A boat according to claim 10, wherein the propelling and steering unit is mounted on the upwardly inclined forward portion of the bottom of the hull.
12. A boat according to any of the preceding claims, wherein a pneumatic or other buffer is provided to encircle the boat hull at or about the water line thereof.
13. A boat according to claim 12, wherein the buffer is of substantial depth.
14. A boat according to any of the preceding claims, wherein the supply of electric current to the motor is effected through a collector arm mounted on a vertically disposed pole or mast on the boat and running in contact with a sheet of conducting netting or the like supported horizontally above the water on which the boat floats.
15. A boat according to claim 14, wherein the return circuit from the motor comprises the water on which the boat floats and a conducting sheet of netting or the like spread over the bottom of the water.
16. A boat according to claim 5, wherein the electrical connections to the motor include flexible leads or contacts running on contact studs or slip-rings mounted on the motor, in order that the latter may be rotated without hindrance.
17. The improved boats for amusement purposes comprising means for propelling and steering same substantially as herein described with reference to the accompanying drawings.

Dated this 26th day of August, 1931.

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